NPC 150803: Movement and genetics of whales in the Canadian Arctic using satellite telemetry, tissue biopsies, and photogrammetry.

Close

Proposal Status: Conformity Determination Issued

Overview Documents

Project Overview

Type of application: New

Proponent name:

Mark Gillespie

Proponent company:

Fisheries & Oceans Canada

Project Description:

Ongoing environmental and anthropogenic changes in the Canadian Arctic have raised concerns regarding the capacity of marine mammal populations to adapt to these new and expanding stressors. In order to assess and mitigate potential impacts from stressors like climate change and the expansion of high Arctic marine shipping activities, a better understanding of contemporary marine mammal stocks, behaviour, and movements in the Canadian High Arctic is needed. Efforts will focus on narwhal (Monodon monoceros) and beluga whale (Delphinapterus leucas) populations in the Gulf of Boothia and Cumberland Sound, NU during summer and fall. Killer (Orcinus orca) and bowhead (Balaena mysticetus) whales are also known to inhabit these areas in summer and may be opportunistically sampled as part of this research program. This study will use remotely-piloted aircraft (drones) to collect photographs and video to assess population structure (i.e. age, sex), body condition and behaviour of individuals and groups of whales. Photos will contribute to ongoing photo-identification studies and population abundance estimates. Videos will be used to assess dive behaviour and group dynamics. Additionally, drones will be used to collect blow vapour samples from whales for hormone and genetic analysis. We will use remote tissue biopsy sampling methods to assess genetic relationships, hormone levels, and diet of Arctic whales. Biopsy samples will be collected using custom crossbows, air rifles, and drone-deployed methods. GPS satellite tags will be applied to adult whales to monitor summer movements and provide information on dive behaviour. Location and movement data will be used to monitor behaviour, habitat use, and seasonal migrations. Dive information (time spent at the surface vs. at depth) will be used to inform correction factors to improve population estimates derived from recent aerial surveys conducted throughout the Arctic. Methods will employ least-invasive techniques and technologies to minimize stress on whales and achieve project goals. Drone operations will be led by licensed and experienced pilots and will follow approved standard operating procedures for operating drones near marine mammals. Biopsy sampling and tagging will use remote sampling methods and utilize small boats and drones to deploy biopsy darts and tags on the water or from land. Only trained and experienced operators will be responsible for

tagging/biopsy efforts. No animals will be captured or handled during this study. Field studies in Cumberland Sound will be based from the community of Pangnirtung and carried out by one or two Nunavut Beneficiaries hired through the Pangnirtung Hunters and Trappers Association. Research in the Gulf of Boothia will be carried out by two to four Nunavut Beneficiaries hired through the Taloyoak Umaruliriqut Association. Two Fisheries and Oceans (DFO) staff will accompany the Gulf of Boothia field team during the initial onset of the field work in 2025. Work will be based from a local Inuit hunting camp in Lord Mayor Bay (Lat. 69.661422 Long. -92.671292) for a period of 3-4 weeks in summer. Field crews will rent local Inuit-owned cabins for lodging and Inuit-owned small boats (<10 m length) with experienced Inuit boat operators familiar with the local environment and marine mammal behaviour. Crews will operate daily excursions from the base camp when weather permits.

Project Schedule

Start Date:

2025-06-01

End Date:

2025-12-01

Project Map

List of project geometries:

Id

Geometry

Location Name

17020

polygon

Cumberland Sound Marine Study Area

17021

polygon

Gulf of Boothia Marine Study Area

17023

point

Lord Mayor Bay Hunting Camp

NPC Planning regions:

No Approved Plan

Project Land Use and Authorizations

Project Land Use:

Scientific Research

Marine-Based Activities

Scientific Research

Licensing Agencies:

Government of Canada - Fisheries and Oceans Canada

Government of Canada - Fisheries and Oceans Canada

Nunavut Water Board

Material Use

Equipment:

Type

Quantity

Type

Use

Boat

1

<30'

Cumberland Sound: Used to search for whales and conduct drone-based photogrammetry and tagging and biopsy sampling activities.

Boat

2-3

<30'

Gulf of Boothia: Used to transport field gear and personnel from Middle Lake (Taloyoak) to Lord Mayor Bay. Boats will be use in Lord Mayor Bay to search for whales and conduct drone-based photogrammetry and tagging and biopsy sampling activities.

Drone

1

n/a

Gulf of Boothia and Cumberland Sound: Small drones will be used to record imagery and videography of whales, biopsy whales, and to monitor whales post tagging/biopsy collection.Various models of DJI drones will be used including: Mini SE, Mini 3, Mini 4 Pro, Mavic 3, Mavic 2, Inspire, Phantom 4 Pro, and Matrice 300.

Crossbow/Air Rifle

2

n/a

Gulf of Boothia and Cumberland Sound: Custom designed crossbows and air rifles will be used for projecting tag and biopsy bolts/darts.

ATV

1

n/a

Gulf of Boothia: ATV will be used to transport gear and haul boats over designated portages along the chain of lakes from Middle Lake to Lord Mayor Bay during camp setup and demobilization.

Fuel Use:

Type

Container

Capacity

Use

Gasoline

10

205

Gulf of Boothia: fuel used for boat operation and general camp use (generator).

Gasoline

10

205

Cumberland Sound: Gasoline will be used in small boats to locate and sample whales. No fuel will be stored or used on land.

Other

4

4

Gulf of Boothia: Naphtha used for cooking/heat source in camp

Hazardous Material and Chemical Use:

Type

Container

Capacity

Use

No data found

Water Consumption:

Daily Amount (m^2)

Retrieval Method

Retrieval Location

1

Gulf of Boothia site only. Local snow melt/runoff pools near camp.

Plastic water jugs will be filled by hand

Waste and Impacts

Environmental Impacts:

Cumberland Sound: Work will be community-based from Pangnirtung with day trips or short multi-day excursions in search of whales when weather permits. Activities will be strictly marine-based. Studies will require the operation of 4-stroke outboard motors on Inuit-owned small boats (<10 m length). Experienced Inuit boat operators familiar with marine mammal behaviour will be employed for this study. Whales will be approached by boat in order to deploy tagging/biopsy darts. Approved animal use protocols will be followed to minimize stress on the animals and to monitor health post-tagging or biopsy sampling. Gulf of Boothia: Work will be based from a local hunting camp in Lord Mayor Bay for a period of 3-4 weeks in summer. Field crews will use local Inuit-owned cabins for lodging and Inuit-owned small boats (<10 m length) with experienced Inuit boat operators familiar with marine mammal behaviour. Crews will operate daily excursions from the base camp when weather permits. This study will involve the use of outboard motors in freshwater and marine environments. Whales will be approached by boat in order to deploy tagging/biopsy darts. Approved animal use protocols will be followed to minimize stress on the animals and to monitor health post-tagging or biopsy sampling.

Waste Management:

Waste Type

Quantity Generated

Treatement Method

Disposal Method

Greywater

<1 m3/day

n/a

Gulf of Boothia only:Grey water will be disposed of on-site, a minimum of 31 m from the high-water mark of any nearby waterbodies.

Non-Combustible wastes

1 m3

n/a

Gulf of Boothia only:General camp waste (food scraps, packaging etc.) will be returned to Taloyoak for proper disposal at the end of the field program.

Sewage (human waste)

<1 m3

n/a

Gulf of Boothia only: Human waste will be disposed of in existing on-site composting toilets.


Parry Channel
Baffin Bay
Gulf of Boothia
Davis Strait
Foxe Basin
Iqaluit
Hudson Strait
QUEBEC
Hudson Bay
esri